

Solve 2-step equations

Notes and guidance

In this small step, children move on to solving equations with two steps.

As with 1-step equations, initially equations of this type can be represented by 2-step “think of a number” problems and/or function machines, where children work backwards using inverse operations to find the original number or input. They can then link this to finding an unknown in a 2-step equation.

Children can also use concrete resources to represent the problems and to work out missing numbers. Bar models are another useful representation, as they give a visual clue to the steps needed to work out the unknowns. It is useful to have the abstract representation alongside the models to help develop understanding.

Things to look out for

- Children may think the values of letters are permanently fixed. For example, having solved an equation for x , they may apply this value for x to a different equation.
- When “working backwards” to solve equations, children may do the inverse operations in the wrong order.

Key questions

- If you know 3 more than $2x$, how can you work out $2x$?
- If you know 5 less than $2x$, how can you work out $2x$?
- How can you represent the problem with a bar model? Which part(s) of the bar model do you already know? Which part(s) can you work out?
- How can you represent the problem with an equation? What is the first step you need to take to solve the equation?
- How can you represent the equation using a function machine? How can you use the function machine to help you solve the equation?

Possible sentence stems

- If _____ x + _____ = _____, then _____ x = _____, so x = _____
- The first step in solving the equation is to _____
The second step in solving the equation is to _____

National Curriculum links

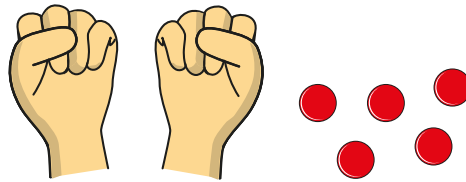
- Express missing number problems algebraically

Solve 2-step equations

Key learning

- Tommy has 17 counters.

He puts the same number of counters (c) in each hand and has some left over.



Which equation shows this?

$c + 2 = 5$	$2c = 17$	$2c + 5 = 17$	$2c + 17 = 5$
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Solve the equation to work out how many counters Tommy has in each hand.

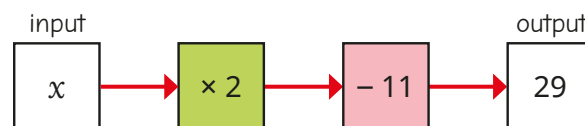
- Kay thinks of a number.

She multiplies the number by 2 and then adds 5

She gets the answer 29

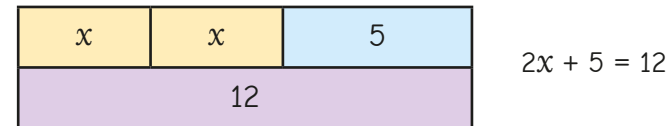
What number did Kay think of?

- Explain how this 2-step function machine shows the equation $2x - 11 = 29$



Work out the value of x .

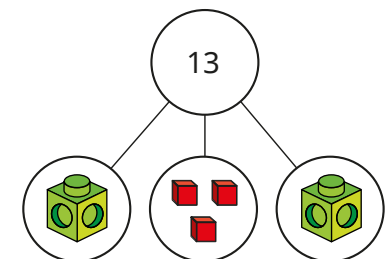
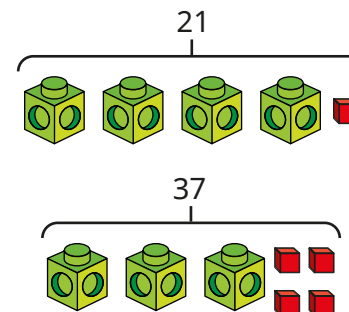
- Ron uses a bar model to solve an equation.



Use Ron's method to solve the equations.

$3b + 4 = 19$	$20 = 4b + 2$
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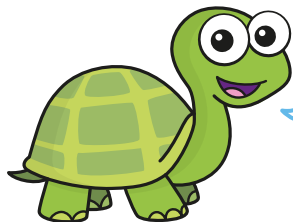
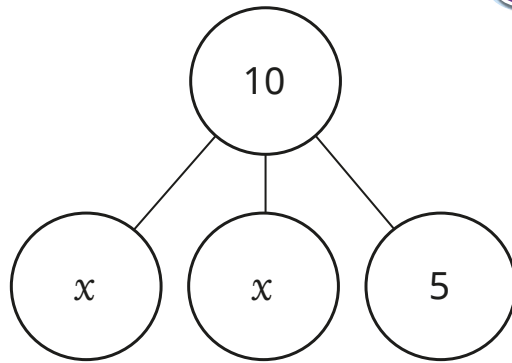
- Write and solve equations for the models.



Solve 2-step equations

Reasoning and problem solving

Tiny is working out the value of x .

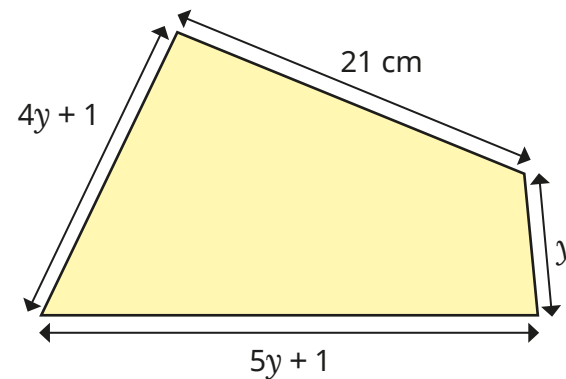


$10 - 5 = 5$,
so $x = 5$

Do you agree with Tiny?
Explain your reasoning.

No

The perimeter of the quadrilateral is 83 cm.



$y = 6$ cm

Work out the value of y .
Explain your method to a partner.